Frequently Asked Questions on the Proposed Michigan Science Standards
Updated November 5, 2015

The following questions are gathered from email and phone communications, the public comment survey, and comments shared during the public information sessions or conference presentations on the proposed Michigan K-12 Science Standards. This list is not the complete list of questions, but rather, a list that identified commonly asked questions (which have been synthesized into single questions from the multiple comments received) that need some additional clarification. MDE will continue to add to this list during the public comment period, and will develop this list into appropriate guidance in the event of adoption of the proposed standards.

About the Standards Development and Review Process

1. Why didn't Michigan just update the science standards instead of developing a completely new set of standards?

The current science standards were adopted by the State Board of Education in 2006. Typically, Michigan has undergone a review/update of standards every 5-7 years to utilize new concepts, research findings, and feedback from educators. In 2010, Michigan had the opportunity to become a lead state in a multi-state standards development effort, which became the Next Generation Science Standards. This effort allowed for a re-visioning of standards based upon data on student learning and current practices in business, industry, and scientific research.

2. Who created the Michigan Science Standards? Who was involved in the process?

The development process occurred in four stages (initial development and two review and modification cycles, and a final modification cycle that was used to transition from the Next Generation Science Standards to the Michigan Science Standards). The development teams were largely comprised on science education specialists from around the country, including two lead developers, plus educators, educational administrators, and scientists from higher education, business, and industry. Review teams were largely comprised of educational leaders in science education, including many Michigan teachers, professional development specialists in science education, higher education faculty, and curriculum leaders from school districts and intermediate school districts (ISDs). Michigan had greater representation than any other participating state, with 66 participants in the project.

3. Is this the "Common Core" for science? Are these standards mandated by the federal government?

No. While the initial effort of developing the Next Generation Science Standards involved multiple states, there are a variety of differences between the Common Core and the proposed Michigan Science Standards. The standards went through multiple review processes with the public, and were developed utilizing the research-based Framework for K-12 Science Education. Also, there are no assessment consortia specific to the science standards, and there is no federal involvement in Michigan's decision to adopt a specific set of science standards, nor was there federal sponsorship of the development of these standards.

4. When does the public, including parents, community members, teachers, and others get to provide input on the standards?

When the standards were being developed, there were two web-based public comment periods which were used to provide feedback on the standards. Over 200,000 unique visitors viewed the standards during these periods. Michigan solicited public comment in April 2013 when the standards were being considered for adoption as the Next Generation Science Standards. Hundreds of responses were gathered at that time from teachers, state leaders, scientists, the business community, and parents and students during that time. Now, after redevelopment of the standards as Michigan Science Standards (see item below), the standards are once again open to public comment, which includes a web-based survey, as well as gathering of comments from public information sessions and conference presentations. If any changes are made to the standards following this, a final review period will be held prior to adoption.

5. How were the standards made into "Michigan Science Standards"? Why was this done?

Three specific modifications have been made to the standards that were originally published in 2013 as the Next Generation Science Standards to the standards that are now proposed as new Michigan K-12 Science Standards. First, the Michigan Science Standards were created from the selection of the individual student performance expectations from the NGSS documents, so that ancillary information that was not relevant to the standards was separate from the document that is proposed for adoption. This gives added flexibility to modify or provide additional guidance separate from that identified as the Next Generation Science Standards. Because the State Board of Education would need to implement another full review process if any changes were made to guidance that was included in the adopted standards document, this process removes this barrier to any eventual modification, and also ensures that any modifications to NGSS would not inadvertently change our standards. Second, Michigan specific contexts were added to relevant standards to focus on unique scientific considerations related to Michigan's geology and weather and to the Great Lakes. Finally, notation is provided that cites opportunities for educators to utilize local, regional, or state resources identified by educator organizations or MDE.

About the Role of Standards in Education and in Local Schools

6. What are "standards"? What is the role of standards?

Content standards are the common expectations of what students should be able to do with respect to the content they are addressing**.** They are commonly a list of performance tasks that students should be able to do to demonstrate understanding of the content they address.

7. How are standards tied to curriculum?

Content standards are not curriculum. As mentioned above, they are simply the performance standards that students should be able to demonstrate in a specific subject by a specific grade level. They drive decisions that local school districts make about their curriculum, but they are not the curriculum itself. School districts and educators should develop their own curriculum and identify resources and instructional strategies they want to use to make sure that students are able to meet the expectations of the standards.

8. How do teachers use the standards in their classroom?

Because the standards outline the common expectations for all students, educators are expected to use the standards to determine what outcomes are expected around specific content areas**.** Educators then use these standards to map out learning activities, assessments, and content topics for their district, building, and classroom in order to ensure that students can meet the standards for their grade level or band. As mentioned above, the standards are not curriculum, nor do they point to specific curriculum or learning activities. Educators should examine their own lessons, instructional resources, course descriptions, and curricula to determine how instruction will allow students to accomplish the performance expectations. Educational leaders should review the standards with respect to local district or building decisions, such as teacher placement and preparation, curriculum, instructional resources, assessments, and course sequences to make system adjustments to ensure these infrastructure elements align with the standards. Likewise, they should review student achievement data to ensure that students are accomplishing the standards, and where not, make changes in the infrastructure to ensure that students can accomplish the standards. This may also include establishing professional learning supports to ensure that teachers are prepared to address standards, and to monitor student progress toward meeting these standards that can inform policy and implementation.

9. Who adopts the standards? What role does the legislature have in this? MDE?

It is the constitutional responsibility of the State Board of Education to adopt academic standards for students in Michigan's public schools. The State Board of Education is an elected body that is independent of the governor or legislature. The legislature is able to enact laws regarding other academic considerations and requirements, and they also determine the budget for school state aid, which can provide funding for specific programs or priorities. The Michigan Department of Education (MDE) works to support implementation of federal and state law regarding schooling, as well as academic standards and related work adopted by the State Board of Education. MDE provides technical assistance and guidance to support implementation of the standards, and implements activities that utilize the standards, such as statewide student assessment or teacher certification requirements.

About the New Topics and Differences in Michigan Science Standards

10. How do new standards improve upon the current Grade Level Content Expectations (GLCE's) and High School Content Expectations (HSCE's) of our current standards?

The proposed Michigan Science Standards still focus on disciplinary content in the sciences, but have a number of new components that represent improvements, including:

- The proposed standards were based on over thirty years of research on science education, as well as current practices and expectations of higher education institutions and business and industry addressing science and engineering concepts and practices.
- The existing standards in Michigan (the GLCE's and HSCE's) primarily address content understandings at a basic level, where students would be expected to describe or explain science concepts. The proposed standards ask students to be able to apply concepts, investigate phenomena, and solve problems – all higher level thinking skills.
- The proposed standards were developed with learning progressions in mind, drawing upon research on how learners develop greater understanding of concepts over time, and that these are developmentally appropriate for learners based on grade level.
- The proposed standards focus on more authentic understandings and applications of science concepts in ways that support better student engagement, learning of concepts, and recognition of career paths in the sciences and engineering.

Michigan contracted with a third-party evaluator (SRI International) to examine the differences between the current and proposed standards, and to develop recommendations based on the evaluation. The evaluation recommended adoption and implementation of the proposed standards for a variety of reasons, and identified five specific recommended actions around the proposed standards. This document can be found on the MDE website for the proposed Michigan Science Standards (http://mi.gov/science).

11. What is new in the proposed standards?

The Michigan Science Standards address science content, but also include *cross-cutting ideas* from multiple science disciplines, and *practices of science*, such as investigation and data analysis. For the first time, the Science Standards also address Engineering Practices and Design. These are meant to include engineering into science instruction, and address the need for students to be acquainted with engineering practices and principles as a part of their broader learning in science.

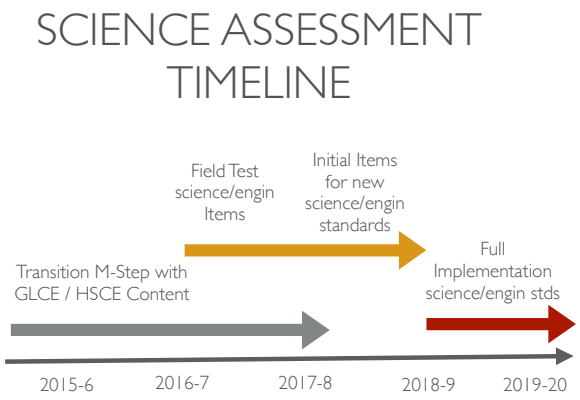
12. How are the Science Standards different from STEM Standards or Requirements?

While the new standards address science and engineering, they should not be considered "STEM standards." STEM learning implies an integrated approach to the fields of science, technology, engineering, and mathematics. There are already existing mathematics standards and technology standards, which are separate from (but aligned to) the science standards. Michigan does not have "STEM Standards" per se to address the integration of these four areas, but rather, has standards in each of these four areas.

About Assessment of Michigan Science Standards

13. When would new standards be assessed on the M-Step assessment?

State level assessments typically lag behind new standards adoption in that it takes considerable time to develop new assessments. For any adoption of new standards, MDE would first go through the test item bank to determine if any items need to be removed or adjusted because of changes in the standards, and this would typically be done in the coming year, as shown in the gray arrow at right. That would mean that items on the 2016-17 M-Step would be aligned to the new standards, but would likely not be fully representative of those standards, in that they would align by content strand and grade level/band, but would not incorporate practices or cross-cutting concepts that might address greater depth of knowledge of content. To be fully aligned, including new assessment items addressing science and engineering practices and cross-cutting concepts, these are likely to be included by 2019 or 2020, as illustrated by the red arrow in the timeline diagram.



14. How will new assessment items be created to address the standards?

All new assessment items are created by Michigan teachers. MDE regularly invites teachers who have volunteered to participate in assessment development to participate in item development sessions to create items aligned to specific standards. The items are then reviewed by MDE staff and entered into a field test pool of questions. Field tests are done every year with about 15% or less of the items, and are not counted on a student's score, but their answers are used to determine if the item was appropriate for general use. Successful field test items are incorporated into the assessment items if they meet a number of outcome and answer distribution thresholds.

15. When will the M-Step fully align to proposed standards?

As shown in the diagram above, the M-Step should be fully aligned by the 2018-19 or 2019-20 school year at the latest, when it includes not only relevant content-focused items by grade band, but also includes tasks that require greater understanding of science practices and cross-cutting concepts.

16. With the grade band configuration of the standards at middle and high school, when would science be assessed in these grades? How will this accommodate the structure of the grade bands?

We are analyzing the current assessment schedule and the grade band configuration of the proposed standards to best determine when science should be assessed. Any change in grade level testing would be preceeded by the writing and field testing of aligned assessment items.

17. Are there vendor assessments for local schools to use that are aligned to the standards?
Currently, there are no known commercially available assessments that are fully aligned to the proposed standards. There are resources available to assist assessment developers at the state and local level with the development of assessments, but, due to the complexity of creating assessments that address the practices, cross cutting concepts, and disciplinary core ideas together, and the time required to develop and test assessments for validity and reliability, none are available at this time. MDE will work to provide information as such tools are developed.

The most comprehensive resource on this issue for assessment developers is *Developing Assessments for Next Generation Science Standards*, by Pellegrino, Wilson, Koenig, and Beatty, published by the National Academies Press. This document is available as a free download at http://www.nap.edu/catalog/18409/developing-assessments-for-the-next-generation-science-standards.

18. How can we deal with student growth measures required by educator evaluation policies?
Michigan's educator evaluation legislation (MCL 380.1249) states that a portion of an educator's overall evaluation should be based on student growth measures. While the newly passed bill (SB103 of 2015) changes the timeline and percentages of an evaluation that are required to use student growth, there are still issues for science education since state assessments are not provided every year for students. The MDE is recommending the use of Student Learning Objectives (SLOs) as a locally determined process for determining student growth over the course of the academic year. Additional information about SLOs is available through MDE resources and workshops.

About Teacher Preparation, Professional Development, and Certification to Support Use of Michigan Science Standards

19. Will MDE or other groups be providing professional development to teachers to address the new standards?

The MDE is working with partner organizations to support the implementation of the new standards, including the considerable professional learning needs for educators. Elements of this are in place now with our science education leaders around the state participating in the TESLA project, which is working with the NGSX. The longer term needs are being addressed by a coalition of organizations, including MDE, the Michigan Science Teachers Association, higher education institutions, intermediate school districts, regional mathematics and science centers, museums and informal education providers, and local school districts and educators. Following adoption, these groups will be scheduling a variety of learning opportunities for individual educators and school districts to take.

20. Will new standards result in changes to teacher preparation? If so, how?

Yes. It is anticipated that there will be several changes in teacher preparation. More of these details are addressed in the presentation on Teacher Preparation and Professional Learning, which is available at http://www.michigan.gov/documents/mde/Teacher_Prep_and_PL_for_Science_SBE_Oct2014_495874_7.pdf

21. How will teacher preparation and certification address the inclusion of engineering, integrated content, and cross-cutting practices?

Michigan is looking at a variety of solutions on this, which include add-on credentials or certification options for educators who have been in the field, but do not have a specific credential that acknowledges an understanding of engineering practices or integrated content, for example. The MDE is working on a range of options, which include the use of digital micro-credentials or "badges" that would allow for additional documentation of a set of skills or competencies for educators. These are part of a broader, long-term plan to be able to address such challenges across multiple subjects over the next 3-5 years. Additional details will be part of the roll-out communications for the new standards in 2016.

About Educator Guidance to Support Use of Michigan Science Standards

22. What guidance will be provided to support implementation of new standards?
The MDE will initiate a "roll-out" plan for communication about and support of the new science standards, following adoption by the State Board of Education. These will include a variety of public information sessions and workshops, webinars, guidance documents, and conference presentations. An initial guidance document, which provides more detailed connections between the performance expectations at each grade level or band, along with the related practices, cross cutting concepts, and disciplinary core ideas, as well as related mathematics and language arts standards, will be available immediately after adoption and publication of the final standards.

23. How will changes be made to guidance materials for the Michigan Science Standards?
The MDE regularly convenes groups of educators to gather input and information that are used in guidance on a variety of issues. It is anticipated that the MDE will identify a number of needs for guidance around the new standards, both based on anticipated concerns and feedback from the field during implementation. The MDE will post information through topic-specific mail-groups and through partner organizations to seek volunteers for participation in the development of guidance materials.

24. Can our school use resources for NGSS, or do they need to specifically support Michigan Science Standards?
The proposed Michigan Science Standards are the student performance expectations from NGSS, with additional contextual and introductory information provided in the standards document. The coding for the performance expectations was specifically included so that educators could identify appropriate resources that might be helpful for specific standards that they are trying to address with their students. Because these are derived from NGSS, educators are free to use any of the NGSS resources to address the Michigan Science Standards. As with all decisions on instructional resources, these are determined locally by individual school districts and educators.

25. Why isn't Michigan just adopting NGSS and all of the related resources?
The primary reason is that the process of adoption requires that the adopted standards not be modified or amended without going through a full adoption process again with the State Board of Education. If Michigan were to adopt NGSS and all resources at large, two problems could arise. First, if the MDE or educators in this state wanted to clarify or add information for the standards, they would have to run through the full adoption process, as the guidance materials for NGSS would become part of the fully adopted set of standards. By pulling out the performance expectations as the standards, this allows ongoing flexibility in using the other efforts for guidance in that they can be modified without having to re-adopt. Second, if there were any modification by the collaborative partnership of states to the NGSS, that would automatically become the new set of science standards in Michigan without Michigan educators having a voice in such a change. While that consideration is unlikely, the separation

of the performance expectations from other NGSS documentation for Michigan's Science Standards ensures that the State Board of Education has authority over the process.

We know that significant guidance will likely be required for implementation of these standards, and that there may be issues in the supplemental resources that the NGSS consortium has developed that we would not specifically want included in the Michigan Science Standards. Therefore, the approach taken should address this issue from a procedural perspective. This approach also allowed for the creation of Michigan-context specific standards, and opens the door for Michigan-specific guidance to be developed over time.

About School Level Implementation of Michigan Science Standards

29. What steps should local school districts take to implement the new standards?
The proposed standards represent a significant change in learning expectations for students in science, and as such, will require some significant changes in instruction and curriculum by educators in the district. The first steps that local districts should take is to

30. Are there models for how schools should redesign their curriculum or course descriptions?
There are a number of models that are being developed as more and more educators review the standards and try to make decisions for their local school context as to how to transition to new courses or course descriptions. The NGSS development team, including many Michigan educators, developed a series of model course maps that propose some different strategies for mapping existing content courses to address the standards. This can be found in Appendix K of the Next Generation Science Standards resources. Additionally, the MDE is working to develop a new course descriptor tool that helps educators address how course descriptions, teacher credentials, and instructional focus might align to credits for the Michigan Merit Curriculum. This new tool will be provided during MDE's rollout effort if the proposed standards are adopted.

31. Our school is in the process of selecting new textbooks – should we wait, or should we look for textbooks that incorporate NGSS standards?
The proposed Michigan Science Standards, which are derived from the NGSS standards (they are the student performance expectations from NGSS), represent a significant shift in understandings that students will need to develop around science and engineering practices, cross cutting concepts, and disciplinary core ideas. It is difficult for textbook developers to make such transitions, especially in the short time since the standards have been published. While there are a growing number of resources that have been developed to specific standards, there are few comprehensive textbooks or other resources that are fully aligned. Such resources may be marketed as having this alignment, but this often includes publication of a modest addendum or crosswalk with existing resources rather than a full rewrite and evaluation that may be required to fully address the new standards.
While textbook purchases and other such curricular and instructional decisions are ultimately in the hands of local school districts and public school academies, the information above would suggest that school districts may wish to wait to make such decisions until more aligned resources are available. Likewise, school district personnel may wish to examine the proposed standards more fully, as many of the performance expectations would suggest that students work with multiple resources and investigations, rather than just text information that is usually contained in textbooks.